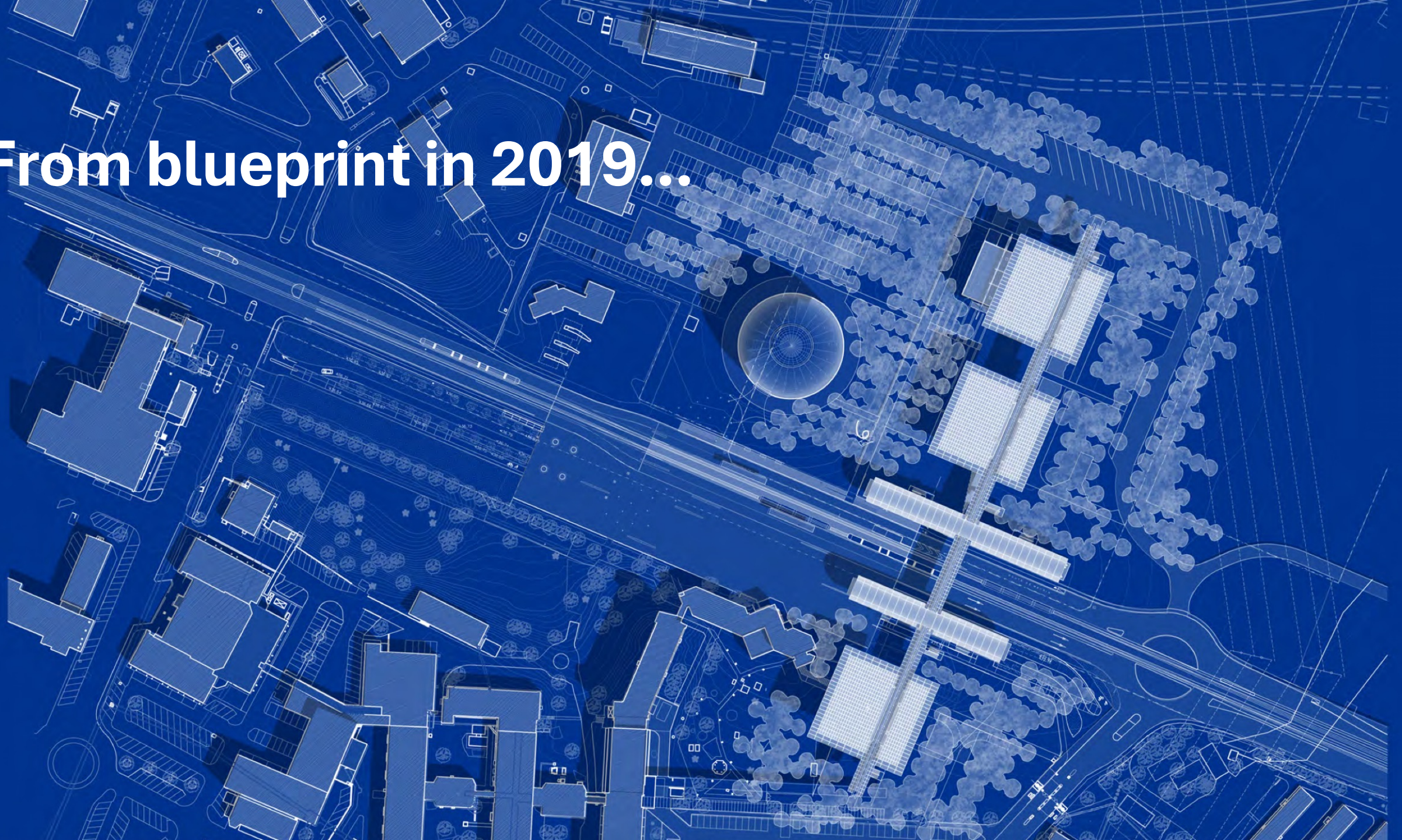




# Introducing Science Gateway

PAERI conference, 28th November 2024 - Emma Sanders, Head of exhibitions, CERN

**From blueprint in 2019...**



...to reality in 2023

TIME

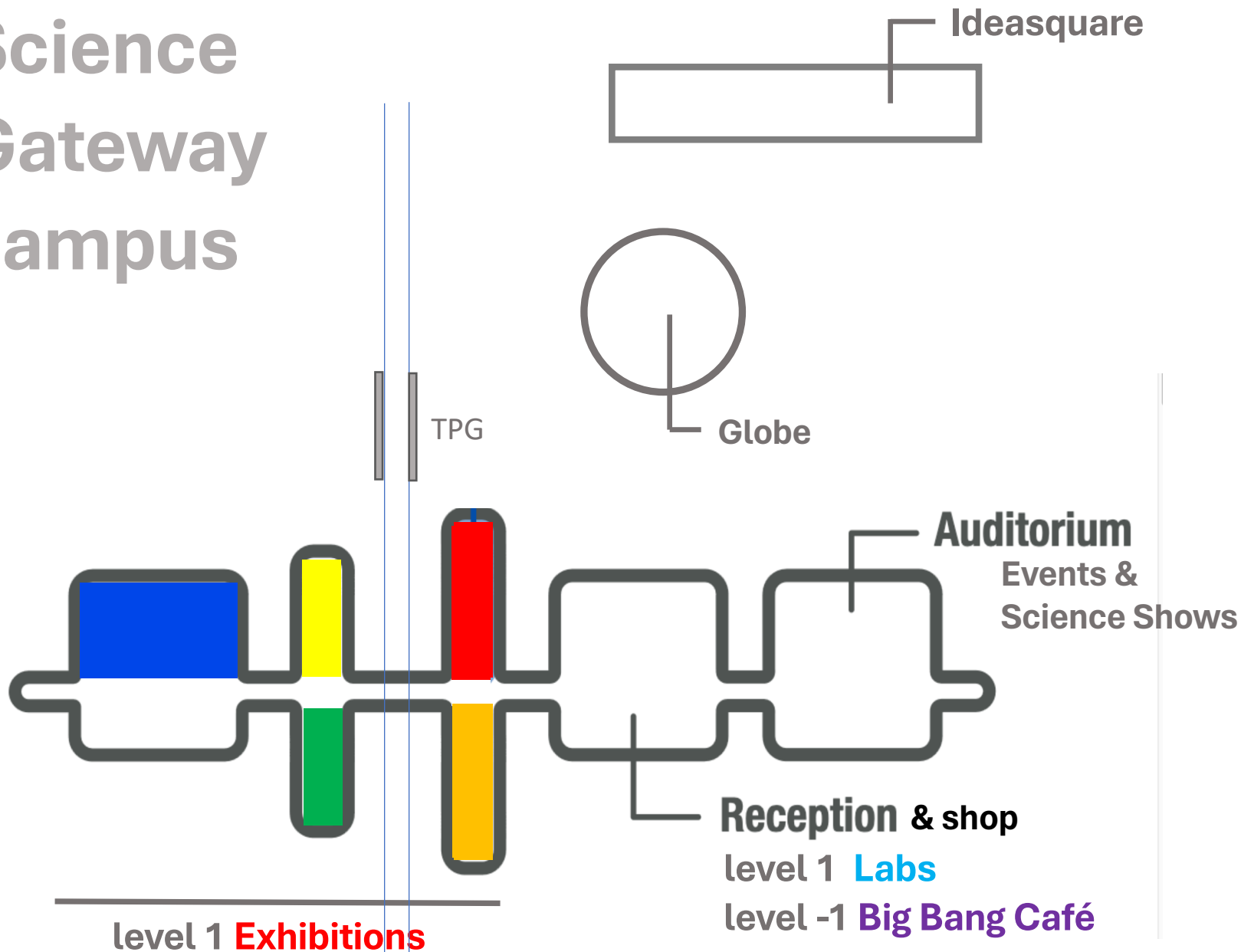
← WORLD'S GREATEST PLACES 2024

**CERN Science Gateway**

Meyrin, Switzerland



# Science Gateway campus



## Labs Reveal your inner scientist

Join a hands-on workshop run by a member of the CERN community. Options for all ages and levels. Advance booking advisable for groups.

## Exhibitions Explore particles at CERN

**Accelerate & Collide:** find out how CERN studies particles, experiment with the technologies used in the Large Hadron Collider and meet the people who work there.

**Back to the Big Bang:** follow the journey your particles took on their way to becoming you.

**Exploring the Unknown:** discover the mysteries of our Universe of particles through the eyes of artists.

**Quantum World:** play games at the wiered and wonderful scale of particles

## Big Bang Café

All our food is freshly made from particles that are 13.8 billion years old. Vegetarian and Vegan options available.

## Accessibility

We'd like to ensure everyone can have an enjoyable experience at Science Gateway. If you have any accessibility need, please just ask a member of staff.

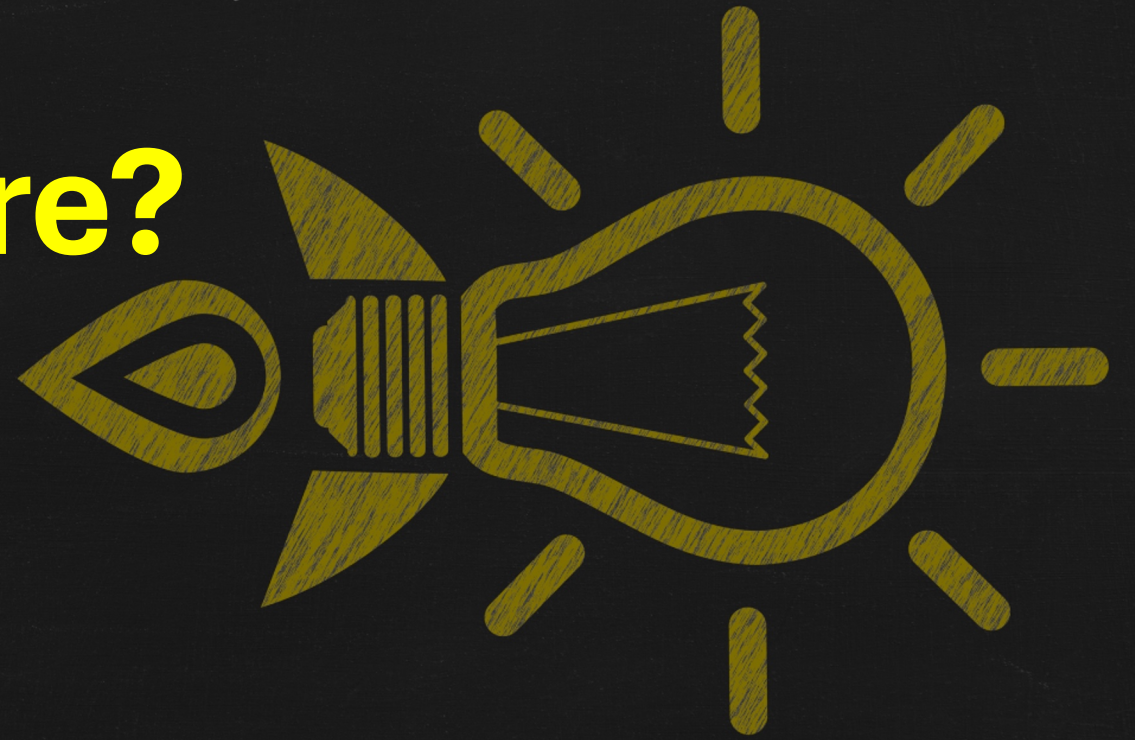
# Our Goals

- Enable a diverse audience across all sectors of the public to **engage** with the science, the discoveries, the technologies and the people working at CERN
- **Inspire** the next generation to explore a career in science and technology
- **Empower** visitors of all ages to make sense of the science that shapes their lives
- **Conserve** and display the heritage of big science, the objects and stories that transmit the tremendous human endeavour in a tangible way.
- **Build ties** across CERN Member States and beyond, encouraging co-creation with other museums, science centres, cultural centres and education networks.



**How did we get there?**

**8 key ingredients**



# 1. Give your scientists plenty of post-its

**TEAM WORK**

**BIG LIFE SIZE RING**

**VARIABLE INTENSITY SOURCE**

**5**

**DETECTOR**  
  
**SOURCE**

**MOVING DIPOLE (ON RAILS)**

**B1**

**B2**

**1 SET B1 (MAKE GO ROUND)**  
**2 SET B2**  
**3 SET BOTH ON FOCUS OR COLLISION**

**DIFFERENT GAME SETTINGS**

**1 SET DIPOLE HIT TARGET (1 REVOLUT ion)**

**2 BEAM ?**  
**+ CROSSING**

**2 TUBES ?**  
**→ ACCURATE REPRESENT.**

**SCORING POINTS**

**2 ACCELERATION INTENSITY Δ DIPOLES ↗**

**FAKE DETECT ORS SIMULATING**

**3 FULL**  
**CRYO VACUUM ACCELERATION**

**DIFFERENT TEAMS DIFFERENT RESPONSIB.**

**SLICE**  
  
**GAS DISCHARGE**

**ice cream.**

**light waves**

**Meissner effect levitate visitors. (guided)**

**balloon in liquid nitrogen**

**cryo. pump liquid + narrow nete**

**alcohol on hand + blow**

**Magnetic fields**  
 → vary poles  
 → vary current  
 → vary filings powder etc.

**Temp/resistance resistor/circuit**

**alcohol on hand + blow**

**4**

**folding of bellows to absorb carbonates (diff. samples: paper? test)**

**how control optical properties of beam. → light + lenses?**

**Bellows**

**cooling → shrinkage**  
**big metal material curves when cooled**

**denar w/ window (danger)**

**Insulation. → Conduction convection radiation.**

**As taken w have visitors → tries different technologies.**

**IR → Pump. add reflection material**

**or. material colour change with T.**

## 2. Interact with your audience groups





### 3. Put hands-on experimentation centre stage



## 4. Vary the experiences, create rhythm



# 5. Tell human-centred stories

Travel back in time to discover how your particles came to be



## NOTRE UNIVERS OUR UNIVERSE

VERS LE BIG BANG  
le temps pour découvrir  
histoire des particules, notre histoire

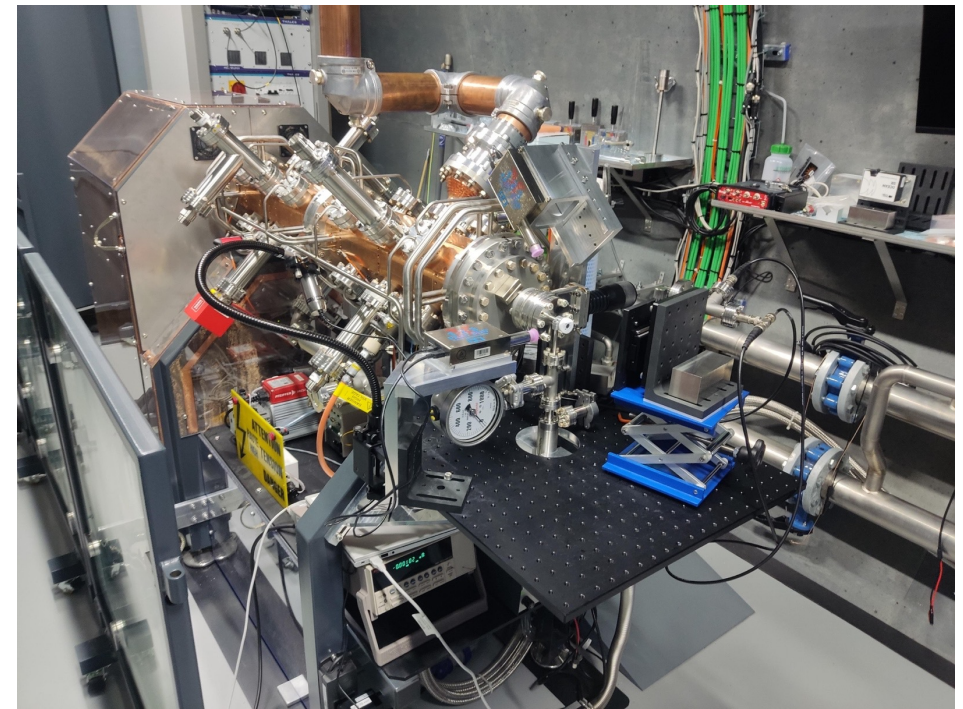
BACK TO THE BIG BANG  
Travel back in time to discover how  
your particles came to be

Everything we know of is made of particles. These particles have always existed. They appeared at the very beginning of the Universe, just after the Big Bang, some 13.8 billion years ago. Over time, they combined to form everything that makes up the Universe: from stars and planets to their inhabitants. At CERN, we study particles by recreating the conditions that existed just after the Big Bang.

CARL  
FOUN



# 6. Make it authentic



# 7. Accessible is better for everyone

les premiers

ig Bang

est le reste d'une supernova, une  
t, les étoiles fabriquent des éléments  
lourds, à partir de la fusion des atomes  
d'hydrogène et l'hélium. En fin de vie,  
se d'énormes quantités  
nouvelles étoiles, leurs  
d'entre elles. Le  
dans les roches,



# 8. Make it fun!



# Inspiration book – sharing content with others



CERN Science Gateway  
Inspiration book

## >> Accelerating and related technologies

CERN Science Gateway  
Inspiration book

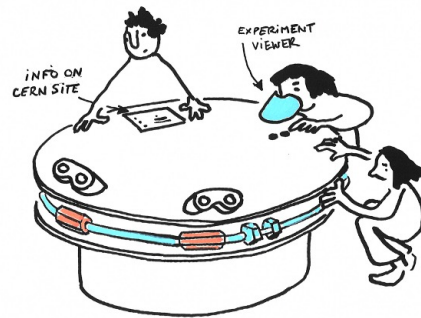
### Introduction

A round table with an aerial print of the landscape above the Large Hadron Collider.

Screens, viewers and models of the experiments are incorporated. These allow visitors to explore the CERN campus, look inside the experiments and learn more about the main components of the Large Hadron Collider.

A combination of 3D models of the accelerator and its experiments and QR codes leading to audio descriptions make the exhibit accessible for blind and visually impaired people.

## Explore the CERN campus



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## >> Accelerating and related technologies

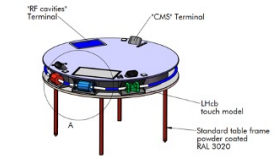
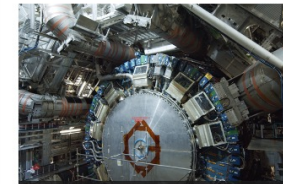
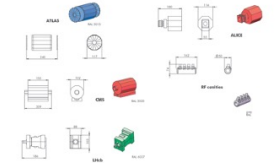
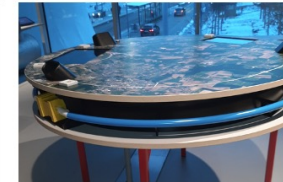
CERN Science Gateway  
Inspiration book

### What CERN can deliver

- Software
- Videos and pictures
- Information texts
- Specifications for hardware
- Drawings of furniture

### What you need to do/buy

- PCs
- Two touch screens
- 3 small screens
- Build furniture and models



### Practical information

Diameter of the table is 1.6 metres.

It is also possible to just show the information that is on the screens:

- Screen with information on Meyrin and Preessin campuses (software is developed for use on a 22" touch screen).
- Screen with information on the accelerators (software is developed for use on a 15.6" touch screen).

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## >> Detecting and analysing

CERN Science Gateway  
Inspiration book

### Introduction

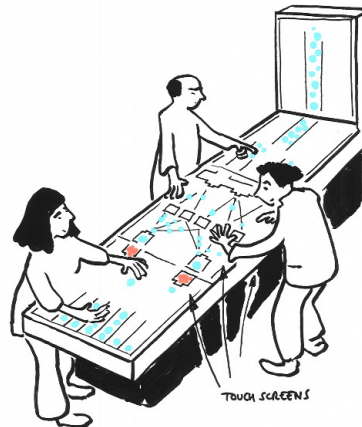
Working together across 3 screens, visitors collaborate to discover the Higgs Boson.

On screen 1, visitors select data from collisions that show signs of a Higgs boson, from the hundreds of millions of collisions that occur every second.

On screen 2, visitors feed this data across the World-wide Computing Grid so it can be analysed.

On screen 3, visitors analyse the data by sorting it into "histograms". If the data has been well selected, an excess of collisions in one of the columns can indicate the presence of a new particle.

## Find the Higgs



## >> Our Universe

CERN Science Gateway  
Inspiration book

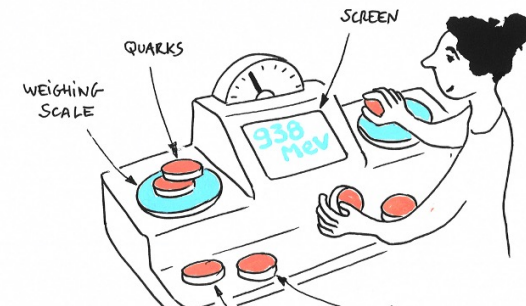
### Introduction

The nucleus of an atom is made up of protons and neutrons. These two particles account for about 99% of the mass of an atom and therefore of matter. But what gives protons and neutrons their mass?

Proton puzzle consists of 2 "weighing scales" (2 platforms with RFID readers) where visitors can place disks (with RFID tags) to compare their mass. These disks symbolise protons, neutrons, up and down quarks and gluons. A 15.6" touch screen guides the visitors through the different steps.

Visitors discover that most of the mass of a proton comes from the binding energy of the gluons.

## Proton puzzle



# Heritage object collection for loan

